

Measuring Brachial Artery Occlusion Pressure Using a Hand-held Doppler and Pulse Oximeter

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ABSTRACT

The measurement of arterial occlusion pressure (AOP) is recommended for the safe and effective use of blood flow restriction (BFR) during training. **PURPOSE:** This study compared measurements of brachial artery AOP using Doppler ultrasound (US), a hand-held Doppler (HHDOP) and a pulse oximeter (PO). **METHODS:** The AOP of the brachial artery was measured simultaneously using US, HHDP, and a PO in the dominant arm of males (n=36) and females (n=49). The blood flow restriction cuff was inflated using a continuous cuff inflation protocol. **RESULTS:** A mixed model ANOVA revealed small but significant ($p < 0.05$) overall main effects (combined males and females) between AOP measured using US (119.8 ± 13.2 mmHg), HHDP (119.1 ± 13.1 mmHg) and PO (118.0 ± 13.2 mmHg), and between males (125.3 ± 13.1 mmHg) and females (114.3 ± 11.1 mmHg). The differences in AOP between males and females was consistent across all three methods of measuring AOP (US, HHDP, PO) and may be attributed to sex differences in limb circumference and systolic blood pressure. The small overall difference between US and HHDP (0.74 ± 2.7 mmHg) was not significant but the difference between US and PO (1.81 ± 3.3 mmHg) measures of AOP was significant ($p < 0.05$). Bland-Altman plots revealed reasonable limits of agreement for both HHDP (-6.02 to 4.5 mmHg) and PO (-7.7 to 4.1 mmHg) measures of AOP. The small differences between US and HHDP or between US and PO measures of AOP are of little practical significance. Inexpensive hand-held devices, such as HHDP and PO are viable options to the use of US to measure AOP prior to BFR during training.